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| 10/562,471                | 11/13/2006  | John Graeme Houston  | 9931-009US          | 6298             |
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| DeMont & Breyer, LLC      |             |                      |                     |                  |
| 100 Commons Way, Ste. 250 |             |                      |                     |                  |
| Holmdel, NJ 07733         |             |                      |                     |                  |
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| TANNER, JOCELYN C         |             |                      |                     |                  |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/562,471

**Applicant(s)**

HOUSTON ET AL.

**Examiner**

JOCELIN C. TANNER

**Art Unit**

3731

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 August 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3, 5-6, 29-31, 33-52 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/S508)
- Paper No(s)/Mail Date 11/04/2008
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This Office Action is in response to the Amendment filed 25 August 2008. Claims 1-3, 5-6, 29-31, 33-52 are now pending. The Examiner acknowledges the amendments to claims 1, 5, 6, 31, 33-35, 47 and 50, the cancellation of claims 4, 7-28 and 32, as well as the addition of claims 51 and 52.

### ***Drawings***

The Examiner has withdrawn the drawing objections to Figures 2 and 3 and acknowledges their understanding of the drawings with respect to the dimensional qualities of the first and second surfaces of the internal formations.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-3, 5, 6, 29-31, 33-37, 39-41, 43, 45, 46, and 50-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sawyer (US Patent No. 5,108,417).**

3. Regarding claim 1, Sawyer discloses an airfoil strip or "longitudinally extending member" within a surface of a conduit, having first and second surfaces directed towards partially towards an inlet and outlet of the conduit, having an asymmetric profile wherein the thickness of the airfoil strip at the forward end (160) is gradually thicker than

the rearward end (170) of the strip (column 4, lines 14-20, Fig. 3). However, Sawyer fails to disclose a 20° angle of the first surface subtending with a diameter of the conduit extending through a portion of the profile of the longitudinally extending member.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have provided a 20° angle of the first surface subtending with a diameter, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

4. Regarding claim **2**, Sawyer discloses longitudinally extending member that is helically shaped (column 3, lines 26-28).
5. Regarding claim **3**, Sawyer discloses longitudinally extending member that is located within the internal side wall of the intravascular stent or "conduit" (column 3, lines 35-36).
6. Regarding claims **5 and 6**, Sawyer discloses first and second surfaces having planar portions wherein the longitudinally extending member has the shape of an airplane wing with a flat upper and lower surface and a curved portion received from the helically wound strip.

7. Regarding claims **29 and 30**, Sawyer discloses concave and convex portions of first and second surfaces of the longitudinally extending member wherein concave and convex portions are formed due to the helically wound strip.

8. Regarding claim **31**, Sawyer discloses all of the limitations previously discussed except for a first surface subtending with the diameter of the conduit extending through the portion of the profile of the longitudinally extending member at a smaller angle than the second surface. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have provided a smaller subtending angle of the first surface, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

9. Regarding claim **33**, Sawyer discloses all of the limitations previous discussed except for the first surface subtending the diameter of the conduit with an angle between 5° and 15°.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have selected a subtending angle having a value between 5° and 15°, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding claim **34**, Sawyer discloses all of the limitations previous discussed except for an angle that the first surface subtends with the diameter of the conduit being substantially 10°.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have selected a subtending angle having a value of 10°, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

10. Regarding claim **35**, Sawyer discloses all of the limitations previous discussed except for a distance along the internal surface of the conduit from the diameter to the point at which the second surface meets the internal surface of the conduit to be substantially 25% of the internal width of the conduit. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have constructed the distance along the internal surface to the point at which the second surface meets the internal surface to be 25% of the internal width, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

11. Regarding claim **36**, Sawyer discloses the longitudinally extending member to have a thickness wherein the two surfaces meet towards a central longitudinal axis (column 3, lines 46-50).

12. Regarding claim **37**, Sawyer discloses the longitudinally extending member to have a thickness wherein the two surfaces meet to form a third surface (column 3, lines 46-50).

13. Regarding claim **39**, Sawyer discloses an airfoil strip or "longitudinally extending member" within a surface of a conduit, having first and second surfaces directed towards partially towards an inlet and outlet of the conduit, having an asymmetric profile wherein the thickness of the airfoil strip at the forward end (160) is gradually thicker than the rearward end (170) of the strip (column 4, lines 14-20, Fig. 3). However, Sawyer fails to disclose a 20° angle of the first surface subtending with a diameter of the conduit extending through a portion of the profile of the longitudinally extending member.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have provided a 20° angle of the first surface subtending with a diameter, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

14. Regarding claim **40**, Sawyer discloses a conduit that is blood flow tubing wherein the blood flows through the conduit which is inserted within a blood vessel to increase blood flow velocity (column 3, lines 27-38).

15. Regarding claims **41 and 43**, Sawyer discloses a conduit to be a vascular prosthesis, i.e. intravascular stent (column 3, lines 26-28).

16. Regarding claim **45**, Sawyer discloses a formation of the longitudinally extending member that affects the spiral flow of a fluid to decrease turbulence and increase velocity (column 4, lines 26-54).

17. Regarding claim **46**, Sawyer discloses a liquid that is blood within a blood vessel (column 35-37).

18. Regarding claim **50**, Sawyer discloses segments of the longitudinally extending member having leading edges of greater height than the trailing edge (column 4, lines 9-12).

19. Regarding claims **51 and 52**, Sawyer discloses differing angles of first faces and second faces the angles are dependent on the placement of the longitudinally extending member within the conduit.

20. **Claims 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sawyer (US Patent No. 5,108,417) in view of Jansen (US Patent No. 5,992,465).**



21. Regarding claim **38**, Sawyer discloses all of the limitations previously discussed except for a third curved surface.

Jansen discloses an internal formation having an apex or a third surface that is curved (FIG.2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a curved third surface to the longitudinally extending member of Sawyer, as taught by Jansen, to provide a smooth surface over which the blood flows to decrease turbulence.

22. **Claims 42, 44 and 47-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sawyer (US Patent No. 5,108,417) in view of Houston et al. (EP 1254645A1).**

23. Regarding claim **42**, Sawyer discloses all of the limitations previously discussed except for a vascular graft as a conduit

Houston et al. discloses helical-flow inducing means that are utilized within grafts (column 3, line 39-41).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted a graft for the stent of Sawyer, as taught by Houston, since it was well known in the art to provide structure within a vessel using a graft to promote drug delivery and tissue ingrowth.

24. Regarding claim **44**, Houston et al. discloses a vascular prosthesis that is a graft/stent combination (column 3, line 39-41).

25. Regarding claim **47**, Houston et al. discloses a conduit having two or more internal formations (FIG. 1).

26. Regarding claim **48**, Houston et al. discloses formations that are in parallel around the conduit (FIG. 4) wherein the formations extend in the same direction and do not intersect.

27. Regarding claim **49**, Jansen discloses formations being in series around the circumference of the conduit (FIG. 2, element #22).

28. **Claims 1-3, 5, 6, 29-31 and 33-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Houston et al. (EP 1254645A1) in view of Wolowacz et al. (US Patent No. 6,946,003).**

29. Regarding claim **1**, Houston et al. discloses an internal formation for a conduit, the formation having a helical-flow inducing means or a "longitudinally extending member" (12) adapted to extend along an inside surface of at least a portion of the length of the conduit (column 2, lines 10-12, 15-10, FIG 1). However, Houston et al. fails to disclose a 20° angle of the first surface subtending with a diameter of the conduit extending through a portion of the profile of the longitudinally extending member.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have provided a 20° angle of the first surface subtending with a diameter, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

However, Houston et al. also fails to disclose the longitudinally extending member having an asymmetric profile in a direction transverse of the longitudinal axis of the member.

Wolowacz et al. teaches biocompatible and implantable elongate elements that are non-woven, knitted or woven material having a non-circular irregular shape or a shape that may vary along its length (column 2, lines 51-60).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided the knitted helical-flow inducing means of Houston et al., with an asymmetric profile, as taught by Wolowacz et al., for the predictable result of inducing helical flow.

30. Regarding claim **2**, Houston et al. discloses a longitudinally extending member (12) that extends helically along the length of the conduit (column 2, lines 1-2 and 7-9, FIG. 1).

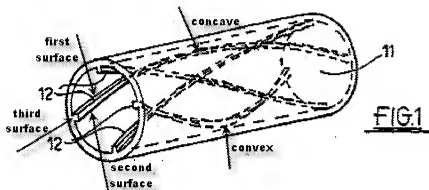
31. Regarding claim **3**, Houston et al. discloses a longitudinally extending member (12) extending helically along the internal side wall of the conduit.

32. Regarding claim **5**, Houston et al. discloses a first surface of the longitudinal member to have a planar portion and/or a curved portion (FIG. 1). Please see marked up figure below.

33. Regarding claim **6**, Houston et al. discloses a second surface having a planar portion and/or a curved portion (FIG. 1). Please see marked up figure below.

34. Regarding claim **29**, Houston et al. discloses a second surface having a curved portion, the curved portion being concave or convex, or a combination of concave and convex (FIG. 1). Please see marked up figure below.

35. Regarding claim **30**, Houston et al. discloses a first surface having a curved portion, the curved portion being concave or convex, or a combination of concave and convex (FIG. 1). Please see marked up figure below.



36. Regarding claim **31**, the combination of Houston et al. and Wolowacz et al. discloses all of the limitations previously discussed except for a first surface subtending with the diameter of the conduit extending through the portion of the profile of the longitudinally extending member at a smaller angle than the second surface. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have provided a smaller subtending angle of the first surface, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

37. Regarding claim **33**, the combination of Houston et al. and Wolowacz et al. discloses all of the limitations previous discussed except for the first surface subtending the diameter of the conduit with an angle between 5° and 15°.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have selected a subtending angle having a value between 5° and 15°, since it has been held that where the general conditions of a claim are

disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

38. Regarding claim **34**, the combination of Houston et al. and Wolowacz et al. discloses all of the limitations previous discussed except for an angle that the first surface subtends with the diameter of the conduit being substantially  $10^\circ$ .

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have selected a subtending angle having a value of  $10^\circ$ , since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

39. Regarding claim **35**, the combination of Houston et al. and Wolowacz et al. discloses all of the limitations previous discussed except for a distance along the internal surface of the conduit from the diameter to the point at which the second surface meets the internal surface of the conduit to be substantially 25% of the internal width of the conduit. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have constructed the distance along the internal surface to the point at which the second surface meets the internal surface to be 25% of the internal width, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

40. Regarding claim **36**, Houston et al. discloses first and second surfaces that extend from the internal surface of the conduit towards each other and towards a central longitudinal axis of the conduit (FIG.1). Please see marked up figure above.

41. Regarding claim **37**, Houston et al. discloses first and second surfaces that are coupled together at an apex or by a third surface (FIG.1). Please see marked up figure above.

42. Regarding claim **38**, Houston et al. discloses an internal formation having an apex or a third surface that is curved (FIG.1). Please see marked up figure above.

43. Regarding claim **39**, Houston et al. discloses an internal formation having a longitudinally extending member with asymmetric profile and extends along an inside surface of a conduit (FIG.1). Please see marked up figure above.

44. Regarding claim **40**, Houston et al. discloses a conduit used for implantation or in devices for improving blood circulation (column 7, lines 20-22, FIG. 1).

45. Regarding claim **41**, Houston et al. discloses a blood flow tubing that is a vascular prosthesis (column 3, lines 12-14).

46. Regarding claim **42**, Houston et al. discloses a vascular prosthesis that is a graft (column 3, line 39-41).

47. Regarding claim **43**, Houston et al. discloses a vascular prosthesis that is a stent (column 3, lines 42-46).

48. Regarding claim **44**, Houston et al. discloses a vascular prosthesis that is a graft/stent combination (column 3, line 39-41).

49. Regarding claim **45**, Houston et al. discloses a formation that effects spiral flow of a fluid flowing through the conduit (column 1, lines 56-58).

50. Regarding claim **46**, Houston et al. discloses a fluid as being a liquid (column 4, lines 27-29).

51. Regarding claim **47**, Houston et al. discloses a conduit having two or more internal formations (FIG. 1).

52. Regarding claim **48**, Houston et al. discloses formations that are in parallel around the conduit (FIG. 4) wherein the formations extend in the same direction and do not intersect.



53. Regarding claim 50, Houston et al. discloses formations that differ in height and/or the angle of the first and/or second faces by selecting ridges having various shapes or sizes (column 2, lines 3-5).

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-3, 5-6, 29-31, 33-52 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments, filed 25 August 2008, with respect to the double patenting rejections of claims 1, 39 and 40 and 42, have been fully considered and are persuasive. The rejections have been withdrawn in response to the amendment of claim 1 incorporating the limitations of claims 4 and 32.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOCELIN C. TANNER whose telephone number is (571)270-5202. The examiner can normally be reached on Monday through Thursday between 9am and 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Todd Manahan can be reached on 571-272-4713. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jocelin C. Tanner/  
11/14/2008  
Examiner, Art Unit 3731

/Todd E Manahan/  
Supervisory Patent Examiner, Art Unit 3731